

REMARKS

Claims 1-21, 35-58, and 64-74 will be pending upon entry of the present Amendment. Claim 67 has been amended, and new claims 72-74 are herein submitted.

Applicants thank the Examiner for indicating the allowability of claims 50-53, 57 and 58. Accordingly, claims 72-74 are herein submitted. Claim 72 comprises the subject matter of claim 50 in independent form, claim 73 comprises the subject matter of claim 53, in independent form, and claim 74 comprises the subject matter of claim 57, in independent form.

The Examiner has rejected claims 1-5, 7-13, 15-19, 21, 35-38, 40-45, 47-49, 54, 64-66, and 68-71 under 35 USC § 103(a) as being unpatentable over David V. Milner, EP 1,139,007 (David, hereafter), in view of Tanaka et al. (US 5,005,370). The Examiner has rejected claims 55 and 56 under 35 USC § 103 as being unpatentable over David in view of Tanaka, and further in view of Jurcik et al. (US 6,076,359) or Fortney (US 3,250,723). Claims 6, 14, 20, 39, 46, and 67 have been rejected under 35 USC § 103(a) as being unpatentable over David in view of Tanaka, and further in view of Barbulesco (US 2,856,759) or Nielsen (US 4,032,070).

In rejecting claim 1, the Examiner states, "It would have been obvious to one of ordinary skill in the art to adapt David with the temperature sensor in place of the pressure sensor to measure the parameters of vaporized gas to further control the liquefied gas source to achieve the desired conditions of vaporized gas."

Applicants call the Examiner's attention to the David specification, in which objects and functions of the David device are described. For example, in the background section David describes previously known systems designed to perform similar functions, "Some such gas supply systems are present for the principle purpose of back-up to a primary gas supply system....Often the continuous supply of gas is critical to life or safety of the process or the prevention of large economic loss-regardless of the presence of energy to operate a control system." (Column 1, lines 35-37, and 46-49.)

In describing the operation of his own device, David states the following, "When the gas is not sufficiently available from a primary source 121, or the primary source fails, flow of liquefied gas is commenced through the conduit 21 from the source 11. This can be

accomplished by simply having a pressure downstream of pilot valve assembly 75 fall below a minimum pressure predetermined by the spring force on one side of the diaphragm 85...If the pressure downstream of the vaporizer rises to high (too much gas flow), the pressure in the pilot valve assembly 75 at the port 77 will increase and override the spring bias force and fully close the valve formed by the valve element 87 and valve seat 88." (Column 7, Lines 10-16, 33-38)

It may be seen from the preceding that David's device is primarily configured to control and regulate a back-up supply to a primary gas supply. Accordingly, David's device is configured to sense gas pressure in the supply line of the primary gas supply. If that gas supply drops off, David's device is configured to sense the drop in pressure, and to open the supply valve 31 in response to that drop in pressure and provide sufficient gas from a secondary source to bring the output pressure back up to a designated pressure.

If David's device were adapted by the substitution of Tanaka's temperature sensor in place of the pressure sensor, as suggested by the Examiner, the resulting device would not function properly, and in fact could result in dangerous conditions. For example, if David's device were instead configured to monitor temperature, it would fail to activate in the event the primary system dropped offline without changing temperature, such as might happen if a line were broken or a tank ran empty. Such a condition could be catastrophic to systems that are critical to life or safety, as described in David's background. On the other hand, such a system would go online inappropriately in case of temperature fluctuations in an otherwise steady supply from the primary source, as could result in a system where the demand drops below normal levels such that gas from the primary source is warmed more than usual, due to the lower volume passing through a primary vaporizer. This condition would result in unnecessary depletion of the backup stock regulated by David's system, which would reduce the back-up system's ability to respond to appropriate demands.

Under MPEP § 2143.02, a combination of David with Tanaka, as proposed by the Examiner, it is inappropriate on at least two counts: Such a combination would render David unsatisfactory for its intended purposes, and such a combination would change the principle of operation of David, inasmuch as currently David is configured to be responsive to changes in pressure, while under the proposed modification, David would be responsive to changes in

temperature, which as previously demonstrated, is clearly a different principle of operation. Accordingly, a combination of David with any art teaching temperature regulation is inappropriate. Thus, claim 1 is allowable over David, in combination with Tanaka. Claims 2-7 and 69, as dependent claims on allowable claim 1, are also therefore allowable.

Independent claim 8 recites, in part, "A temperature sensor configured to...produce a sensed temperature pressure in the thermal expansion chamber in response to the sensed temperature, [and] a valve . . . being moved toward the closed and opened configurations in response to the pressure sensor sensing the differential pressure in the thermal expansion chamber and the liquefied gas inlet chamber, with the pressure in the thermal expansion chamber being dependent on the sensed temperature of the gas vapor...."

In rejecting claim 8, the Examiner has acknowledged that David does not teach a temperature sensing element to control the capacity control valve. In particular, David fails to teach a valve in which the pressure in the thermal expansion chamber is dependent on the sensed temperature of the gas vapor, as recited in claim 8. As previously demonstrated, a combination of David with Tanaka, as proposed by the Examiner, is inappropriate, inasmuch as such a combination would render David inoperative for its intended purpose. Accordingly, claim 8 is allowable over David in view of Tanaka. Dependent claims 9-15 are also therefore allowable.

Independent claim 16 recites, in part, "A capacity control valve having a temperature sensor configured to sense a temperature of gas vapor produced by the heat exchanger and to produce a sensed temperature pressure in response . . . , and a valve regulating the flow of liquefied gas . . . in response to variations in the difference in the sensed temperature pressure and the pressure of the liquefied gas...."

David fails to teach a valve regulating the flow of liquefied gas in response to variations in the difference in the sensed temperature pressure and the pressure of the liquefied gas, as recited in claim 16. A combination of David with any art teaching direct control of David's valve in response to temperature, such as Tanaka is inappropriate, inasmuch as David's device is specifically configured to respond to variations in pressure from a primary gas source, for the purpose of responding to reductions in that pressure. Substitution of a temperature sensor would render David's device incapable of responding to fluctuations in gas flow from the

primary source. Accordingly, the rejection of claim 16 over David in combination with Tanaka is inappropriate, and thus claim 16 is allowable, together with dependent claims 17-21 and 70.

David fails to teach a valve being moved toward the closed and opened configurations in response to the pressure sensor sensing the difference in the sensed temperature pressure and the pressure of the liquefied gas, as recited in claim 35. A combination of David with Tanaka is inappropriate, and thus Tanaka cannot provide this limitation.

In addition, claim 35 recites a manifold and a plurality of vaporizers, each including a heat exchanger, a capacity control valve, and an outlet structured to release the gas vapor to the manifold. The Examiner has suggested that such a limitation would be obvious to one of ordinary skill in the art, given a demand for a large quantity of vaporized gas. Applicants respectfully traverse this position. Multiple gas sources, configured to provide a large volume of gas are known in the industry. Commonly, such multiple gas sources are arranged to feed into a common manifold, which is then provided to a single vaporizer. However, by providing a plurality of vaporizers, which then supply vaporized gas to a manifold, each vaporizer can more precisely control the flow of gas from a separate source for optimum output, resulting in a more reliable and efficient output from the manifold. This concept is not well known in the art, nor is it obvious, given the state of the art.

Accordingly, for at least these reasons, claim 35, together with dependent claims 36-40, are allowable over the cited art.

Claim 41 recites, "Sensing a difference in the sensed temperature pressure and a pressure of the liquefied gas supplied by the source of liquefied gas, and adjusting the flow rate of the liquefied gas into the heat exchanger in response to the difference in the sensed temperature pressure and the pressure of the liquefied gas."

As previously demonstrated, David fails to teach a device capable of sensing a difference in a sensed temperature pressure and a pressure of liquefied gas, or capable of adjusting a flow rate of liquefied gas in response to such a difference. Additionally, as previously demonstrated, a combination of David with Tanaka is inappropriate, inasmuch as such a combination would render David unsatisfactory for its intended purpose. Accordingly, claim 41, together with dependent claims 42-53 is allowable over the cited prior art.

Claim 54 recites, in part, "A flow regulator valve arranged to regulate the flow of liquefied gas from a source of liquefied gas to the heat exchanger inlet in response to the pressure sensor sensing the difference in the sensed temperature pressure and the pressure of the liquefied gas supplied by the source of liquefied gas."

David fails to teach this limitation, nor is it appropriate to combine David with Tanaka, as suggested by the Examiner. Accordingly, claim 54 is allowable over David in view of Tanaka. Claims 55-58, as dependent claims on claim 54, are also allowable thereover.

Claim 64 recites means for sensing a difference in the sensed temperature pressure and a pressure of the liquefied gas supplied by the source of liquefied gas, and means for regulating a flow of liquefied gas in response to the difference. As acknowledged by the Examiner, David fails to teach this limitation. A combination of David with Tanaka is inappropriate, inasmuch as such a combination would render David inoperative for its intended use. Accordingly, David and Tanaka cannot be combined to suggest limitations of claim 64, which is therefore allowable. Claims 65-68 are also allowable, together with independent claim 64.

Claim 71 recites, in part, "A flow regulator having a first input coupled to the output of the temperature sensor, a second input coupled to a source of liquefied gas..., the regulator configured to compare the first pressure to the second pressure and to adjust a flow of liquefied gas from the second input to the output to a flow rate selected according to a pressure differential of the first and second pressures."

As acknowledged by the Examiner, David fails to teach this limitation, nor can Tanaka be combined with David for such a teaching, inasmuch as such a combination would render David unsatisfactory for its intended purpose. Accordingly, claim 71 is allowable over the cited art.

Claim 67 has been amended to correct a typographical error. This amendment does not alter the scope of the claim.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited. In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner

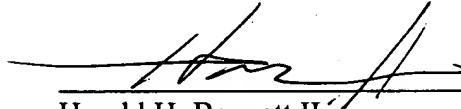
Application No. 09/878,870
Reply to Office Action dated August 22, 2003

is urged to contact applicants' undersigned representative at (206) 622-4900 in order to expeditiously resolve prosecution of this application.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

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